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GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
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19 May 2005

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: METHOD OF PREPARATION OF HETEROCYCLIC MOLECULES WITH PHARMACEUTICAL PHARMACEU-
TICAL EXCIPIENT COSMECEUTICAL AGROCHEMICAL AND INDUSTRIAL USES

(57) Abstract: Processes for preparing racemic and optically pure 3,6-dihydro-2H-pyrans of formulae H, I, N and O are described. These compounds may be further transformed into compounds of formulae J, K, L, M, P, Q, S, T, U, V, Y and Z with potential pharmaceutical, pharmaceutical excipient, cosmeceutical, agrochemical and industrial applications.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/01344

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C07C 69/017, 69/732; C07D 309/30; C12P 17/06

US CL : 435/125; 549/420; 560/60, 145, 183

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 435/125; 549/420; 560/60, 145, 183

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CAS ONLINE-Structure searches

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,151,205 A (COHEN et al) 24 April 1979 (24.04.1979)	1-33

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

19 November 2004 (19.11.2004)

Date of mailing of the international search report

16 MAR 2005

Name and mailing address of the ISA/US

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/01344

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-33

Remark on Protest

☐
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US04/01344

BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-33, drawn to methods and compounds involving a ring-closing metathesis reaction.

Group II, claims 34-54, drawn to processes of making 3,4-dihydroxytetrahydropyrans and compounds made by the process.

Group III, claim(s) 55-60, drawn to process for making bridged bicyclic lactones and compounds made by the process.

Group IV, claim(s) 61-66, drawn to a process for ring opening said lactone and the compounds made thereby.

Group V, claim(s) 67-73, drawn to a process of making 2,3-dihydro 6H pyran-2-methanols by reduction and compounds made thereby.

Group VI, claim(s) 74, drawn to certain 3-alkoxy or 3-acyloxy 2,3-dihydro 6H-pyran-2-methanols.

Group VII, claim(s) 75-80, drawn to a process of making epoxytetrahydropyrans and compounds made by it.

Group VIII, claim(s) 81-89, drawn to a process of reacting said epoxides with a nucleophile.

Group IX, claim(s) 90-99, drawn to the compounds made by the above process.

Group X, claim(s) 100-123, drawn to a process for making fused dioxanopyrans and the products produced thereby.

Group XI, claim(s) 124-130, drawn to a process of making 2-alkenyloxy-3-oxyalkenols and compounds produced thereby.

Group XII, claim(s) 131-137 drawn to a method of making alkenyloxy-1,3-dioxanes using the above as a reactant and product produced thereby.

Group XIII, claim(s) 138-149, drawn to a process for making dioxanodihydropyrans by ring closing metathesis.

Group XIV, claim(s) 150-173, drawn to an enzymatic resolution process involving epoxytetrahydropyrans which contain a hydroxy group.

The inventions listed as Groups I-XIV do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: An indicator is the many provisos in the generic claims drawn to compounds which exclude specific compounds. See claims 39, 54, 60, 66, 72 and 74 e.g. This indicates that old compounds are being excluded. The claims drawn to methods of producing intermediates leading up to these compounds and the compounds produced then cannot be said to contain the special technical feature which produces patentability. Further note the many enzymatic resolution processes which are quite different from the other claimed procedures and which may be said to involve a different technical feature..